

## Patent Claims:

1. Self-supporting, heliothermal flat collector module (10.1, 10.3), including:

- a sheet metal panel (1),
- a register-shaped arrangement (30) of capillary tubes (3.1, ..., 3.n) separated from one another at a distance for the flow of a fluid medium that lies on the side opposite the side of the sheet metal panel (1) to be irradiated (11.1), and
- a thermally insulating insulation core (4) that is also positioned on the rear side,

characterized in that

- the capillary tubes (3.1, ..., 3.n) of the register-shaped arrangement (30) are placed in contact with the surface (5) of the thermally insulating insulation core (4), and
- the thermally insulating insulation core (4) is bonded to the sheet metal panel (1) by means of an elastic adhesive layer (2), whereby capillary tubes (3.1, ..., 3.n) are at least partially embedded into the adhesive layer between the sheet metal panel (1) and the insulation core (4).

2. Flat collector module (10.2) as in Claim 1, characterized in that each of the capillary tubes (3.1, ..., 3.n) of the register-shaped arrangement (30) is placed into a slot (14) worked into the insulation core (4), whereby the capillary tubes (3.1, ..., 3.n) lie essentially flush with the insulation core (4) or extend above the insulation core (4) by an amount (H), which amount essentially corresponds to the thickness dimension (D) of a fluid adhesive layer (2) before hardening.

3. Flat collector module (10.2) as in Claim 1, characterized in that the surface of the insulation core is flat, and that the capillary tubes (3.1, ..., 3.n) are laid directly onto the flat surface.

4. Flat collector module as in Claim 1 through 3, characterized in that the thermally insulating insulation core (4) consists of foam.

5. Flat collector module as in Claim 4, characterized in that the foam consists of foamed polystyrene or polyurethane.

6. Flat collector module as in Claim 1 through 3, characterized in that the thermally insulating insulation core (4) consists essentially of fibers.

7. Flat collector module as in one of Claims 1 through 5, characterized in that the material of the adhesive layer (2) has

a higher thermal-conductivity coefficient than the material of the insulation core.

8. Flat collector module as in one of Claims 1 through 5, characterized in that the adhesive layer (2) is formed of an adhesive based on meth-acrylate.

9. Flat collector module as in one of the previous Claims, characterized in that the slots (14) possess a triangular, rectangular, oval, partially-round, or  $\Omega$  cross-section.

10. Flat collector module as in one of the previous Claims, characterized in that the capillary tubes (3.1, ..., 3.n) consist of metal, of peripherally metal-coated plastic, or of non-coated plastic.

11. Flat collector module as in one of the previous Claims, characterized in that the surface (5) that is flat or provided with slots (14) includes numerous recesses (6) to receive the adhesive.

12. Flat collector module as in Claim 11, characterized in that the recesses (6) extend essentially to the slot depth ( $T_N$ ), or extend slightly past it.

13. Flat collector module as in Claim 11 and 12, characterized in that the recesses (6) are formed by the pressure of a bristle roller or similar.

14. Flat collector module as in one of the previous Claims, characterized in that the sheet metal panel (1) is of one piece with two angled, arc-shaped edge profiles (16; 17).

15. Flat collector module as in one of the previous Claims, characterized in that the sheet metal panel (1) is of one piece with two opposing, angled edges (13.1, 13.2) to connect the sheet metal panels to one another in a folded technique.

16. Flat collector module as in one of the previous Claims, characterized in that the side of the insulation core (4) facing away from the sheet metal panel (1) is supported by a plate-shaped stiffening element (23).

17. Flat collector module as in one of the previous Claims, characterized in that the insulation core (4) is partially surrounded by a plastic or metal cassette (20).

18. Flat collector module as in Claim 17, characterized in that the metal cassette (20) includes two opposing margins (21) angled outwards so that an elastic body (22) is positioned between the angled margin (21) of the metal cassette (20).

19. Flat collector module as in Claim 18, characterized in that the elastic body (22) is a foam strip or adhesive band.

20. Flat collector module as in one of the previous Claims, characterized in that the sheet metal panel (1) consists of a titanium-zinc alloy.

21. Flat collector module as in one of the previous Claims, characterized in that it possesses an overall thickness, including insulation core, of between 10 mm and 50 mm, preferably between 25 mm and 35 mm.

22. Flat collector module as in Claim 1 and additional Claims 2 through 21, installed in a stair step roof (40), whose surface consists of sheet metal panels (1) connected to one another.